Claims

We claim:

1. An artificial replacement disk that is positionable between vertebrae comprising:

an upper housing including an upper cavity;

a lower housing including a lower cavity;

a first spacer and a second spacer, said first and second spacers mounted on a shaft with a resisting member located between the first and the second spacers, which resisting member can urge said first and second spacers apart; and

said first and second spacers partially located in said upper cavity and partially located in said lower cavity.

2. The disk of claim 1 wherein at least one of said upper cavity and said lower cavity includes a ramp and at least one of said first spacer and said second spacer can slide relative to said ramp.

3. The disk of claim 1 wherein at least one of said upper cavity and said lower cavity includes a ramp and at least one of said first spacer and said second spacer can slide relative to said ramp in order to allow said first housing to move relative to said second housing.

4. The disk of claim 1 wherein at least one of said upper cavity and said lower cavity

includes a ramp and at least said first spacer and said second spacer includes a ramp with can mate with the ramp of the at least one of said upper cavity and said lower cavity.

5. The disk of claim 1 wherein when the upper housing and the lower housing are urged together, said first spacer and said second spacer move relative to each other.

6. The disk of claim 1 wherein when the upper housing and the lower housing are urged together, one of the first spacer and the second spacer moves toward the other of the first spacer and the second spacer.

7. The disk of claim 1 wherein when the upper housing and the lower housing are urged together, the first spacer and the second spacer moves toward each other.

8. The disk of claim 1 including a retainer that maintains no more that a maximum distance between the upper housing and the lower housing.

9. The disk of claim 1 wherein at least one of the upper cavity and the lower cavity is concave in shape.

10. The disk of claim 1 wherein at least one of the upper cavity and the lower cavity has a

first sloping end, a central cylindrical portion, and a second sloping end.

11. The disk of claim 1 wherein at least one of the upper cavity and the lower cavity is kidney shaped.

12. The disk of claim 1 wherein at least one of the upper cavity and the lower cavity is substantially elliptically shaped.

13. The disk of claim 1 wherein at least one of the first spacer and the second spacer includes a ramp.

14. The disk of claim 1 wherein at least one of the first spacer and the second spacer is oval-shaped.

15. The disk of claim 1 wherein at least one of the first spacer and the second spacer is bell-shaped.

16. An artificial replacement disk that is positionable between vertebrae comprising:

a first housing including a first cavity;

a second housing including a second cavity;

a first spacer and a second spacer, said first and second spacers mounted on a shaft with a resisting member located between the first and the second spacers, which resisting member can urge said first and second spacers apart; and

said first and second spacers partially located in said first cavity and partially located in said second cavity; and

when the first housing is urged toward the second housing the first and the second spacers move relative to each other and against the resisting member.

17. The disk of claim 16 wherein said first and said second housings have first and second elongated sides respectively, and wherein at least one of the first and second spacers can move along a direction of the first and second elongated sides, such that when the first and second housing are urged together at an angle that is non-parallel to at least one of the first and second elongated sides, the at least one of the first and second spacers move along the direction of the first and the second elongated sides.

18. The disk of claim 16 wherein at least one of the first cavity and the second cavity has a first sloping end, a central cylindrical portion, and a second sloping end.

19. An artificial replacement disk that is positionable between vertebrae comprising:

an first housing and a second housing; and

means located between the first housing and the second housing for moving at an angle with respect to a direction that the first housing and the second housing can be urged together in order to absorb energy when the first housing and the second housing are urged together.

20. An artificial replacement disk comprising:

a housing that can move in a first direction in order to move a spacer along the housing in a second direction in order to change the over all dimensions of the housing.

21. An artificial replacement disk that is positionable between vertebrae comprising:

a first housing including a cavity;

a second housing;

a first spacer and a second spacer, said first and second spacers mounted on a shaft with a resisting member located between the first and the second spacers, which resisting member can urge said first and second spacers apart;

said first and second spacers at least partially located in said cavity;

wherein the cavity has a sloping portion, and a cylindrical portion; and

when the first housing is urged toward the second housing the first and the second spacers move relative to each other and against the resisting member with one of the first and second spacers moving along the sloping portion of the cavity and toward the cylindrical portion.

22. An artificial spinal disk adapted to be positioned between adjacent vertebrae of a spine, comprising:

an upper plate;

a lower plate positioned opposite the upper plate such that a gap having a maximum width exists between the lower plate and the upper plate;

a device that can urge the upper and lower plates apart; and

wherein when the upper plate and the lower plate are urged together, the gap between a portion of each of the upper plate and the lower plate narrows, such that the gap between a remaining portion of each of the upper plate and the lower plate is no wider than the maximum width.

23. The artificial spinal disk of claim 22, further comprising:

at least one spacer positioned between the upper plate and the lower plate;

wherein when the upper plate and lower plate are urged together, the at least one spacer slides away relative to the housing.

24. The artificial spinal disk of claim 22, further comprising:

a first spacer positioned between an first portion of the upper plate and an first portion of the lower plate;

a second spacer positioned between a second portion of the upper plate and a second portion of the lower plate; and

wherein when the upper plate and lower plate are engaged together, one or both of the first spacer and the second spacer slide toward each other.

25. The artificial spinal disk of claim 24, further comprising:

a shaft positioned such that at least a portion of the shaft is between the first spacer and the second spacer;

wherein a load is applied along the shaft, the load urging the first spacer and the second spacer apart.

26. The artificial spinal disk of claim 25, further comprising:

a spring associated with the shaft for applying the load.

27. The artificial spinal disk of claim 24, wherein a cavity of at least one of the upper plate and the lower plate includes a ramp.

28. The artificial spinal disk of claim 24, wherein a cavity at least one of the upper plate and the lower plate is kidney shaped.

29. The artificial spinal disk of claim 27, wherein the first spacer has a substantially ovoid- shaped cross-section such that the first spacer substantially conform to the ramp of at least one of the upper plate and the lower plate.

30. The artificial spinal disk of claim 27, wherein the first spacer has a substantially bell-shaped cross-section such that the first spacer substantially conforms to the ramp of at least one of the upper plate and the lower plate.

31. The artificial spinal disk of claim 28, wherein the first spacer has a substantially oval-shaped cross-section such that the first spacer substantially conforms to at least one of the upper plate and the lower plate.

32. The artificial spinal disk of claim 28, wherein the first spacer has a substantially bell shaped cross-section such that the first spacer substantially conform to at least on of the upper plate and the lower plate.

33. The artificial spinal disk of claim 22, further comprising:

a latch mechanism connected with at least one of the upper plate and the lower plate;

a receiving mechanism connected with at least one of the upper plate and the lower plate that can receive the latch mechanism; and

wherein the latch mechanism prevents at least a portion of the gap expanding beyond a maximum width.

34. The artificial spinal disk of claim 22, wherein the upper plate and lower plate each comprise one of titanium, stainless steel, or PEEK.

35. The artificial spinal disk of claim 24, wherein the first spacer and the second spacer each comprise one of titanium, stainless steel, or PEEK.

36. The artificial spinal disk of claim 22, further comprising:

a plurality of ridges on at least one of the upper plate and lower plate adapted to grip an associated vertebra.

37. An artificial spinal disk adapted to be positioned between adjacent vertebrae of a spine, comprising:

a first portion, including:

a first upper plate;

a first lower plate positioned opposite the first upper plate such that a gap having a maximum width exists between the first lower plate and the first upper plate;

a first device that can urge the first upper and first lower plates apart; and

wherein when the first upper plate and the first lower plate are urged together, the gap between a portion of each of the first upper plate and the first lower plate narrows, such that the gap between a remaining portion of each of the first upper plate and the first lower plate is no wider than the maximum width;

a second portion, including:

a second upper plate;

a second lower plate positioned opposite the second upper plate such that a gap having a maximum width exists between the second lower plate and the second upper plate;

a second device that can urge the second upper and second lower plates apart;

wherein when the second upper plate and the second lower plate are urged together, the gap between a portion of each of the second upper plate and the second lower plate narrows, such that the gap between a remaining portion of each of the second upper plate and the second lower plate is no wider than the maximum width;

a device that can join the first portion with the second portion.

38. A artificial spinal disk for substituting at least a portion of a spinal disk between adjacent vertebrae, comprising:

an upper housing adapted to be positioned adjacent to a first vertebra;

a lower housing positioned opposite the upper housing, the lower housing adapted to be positioned adjacent to a second vertebra;

an first spacer positioned between the upper housing and the lower housing such that an first gap can exist between an first end of the upper housing and an first end of the lower housing;

a second spacer positioned between the upper housing and the lower housing such that a second gap can exist between a second end of the upper housing and a second end of the lower housing;

a shaft;

the first spacer and the second spacer mounted on the shaft;

a device that can urge the first and second spacer apart; and

wherein when the upper housing and the lower housing are urged together, the space between the first spacer and the second spacer can be reduced.

39. The artificial spinal disk of claim 38, wherein the shaft includes a spring for applying the load.

40. The artificial spinal disk of claim 38, wherein a cavity of at least one of the upper housing and the lower housing has a ramp.

41. The artificial spinal disk of claim 38, wherein a cavity of at least one of the upper housing and the lower housing is kidney-shaped.

42. The artificial spinal disk of claim 40, wherein the first spacer has a substantially oval-shaped cross-section such that the first spacer substantially conforms to the ramp at least one of the upper housing and the lower housing.

43. The artificial spinal disk of claim 40, wherein the first spacer has a substantially bell-shaped cross-section such that the first spacer substantially conforms to the ramp of at least one of the upper housing and the lower housing.

44. The artificial spinal disk of claim 38, wherein when the upper housing and the lower housing are urged together, the first spacer slides along the upper housing and the lower housing and in a cavity to reduce the space between the first spacer and the second spacer.

45. The artificial spinal disk of claim 38, further comprising:

a latch mechanism on at least one of the upper housing and the lower housing;

a receiving mechanism that can receive the latch mechanism on at least the other of the upper housing and the lower housing; and

wherein the latch mechanism prevents the upper and lower housing from expanding beyond a desired distance.

46. The artificial spinal disk of claim 38, wherein the upper housing and lower housing each comprise one of titanium, stainless steel, or PEEK.

47. The artificial spinal disk of claim 38, wherein the first spacer and the second spacer each comprise one of titanium, stainless steel, or PEEK.

48. The artificial spinal disk of claim 38, further comprising:

a ridge on at least one of the upper housing and lower housing for gripping an associated vertebra.

49. The disk of claim 22 wherein:

the first and second spacers have shapes of revolution.

50. The disk of claim 22 wherein:

said first and second spacers have first and second spacer ramps respectively.

51. The disk of claim 22 wherein:

said first and second spacers each have housing contact surfaces that are wider than the spacers are tall.

52. The disk of claim 22 wherein:

said first and second spacers are conically-chaped with rounded edges.

53. An artificial spinal disk that is adapted to be placed between adjacent vertebral bodies of a spine, comprising:

an upper elongated housing;

a lower elongated housing;

a first spacer and a second spacer positioned relative to an elongated shaft between the first and second housings with the elongated shaft being about parallel to the upper and lower elongated housings;

a spring mechanism positioned along said shaft in order to urge said first and second spacers apart; and

wherein when the upper and lower housings are urged together at least one of the first and second spacers can move relative to the other against the spring mechanism

54. The disk of claim 53 wherein:

the first and second spacers have shapes of revolution.

55. The disk of claim 53 wherein:

said first and second spacers have first and second spacer ramps respectively.

56. The disk of claim 1 wherein at least one of the housings includes a keel adapted to be positioned in a vertebral body of a vertebra.

57. The disk of claim 1 wherein at least one of the housings includes a keel that is

positioned on said at least one housing so that with the disk implanted in a spine the keel is oriented laterally with respect to the spine.

58. The disk of claim 1 wherein at least one of the housings includes a keel that is positioned on said at least one housing so that with the disk implanted in a spine the keel is substantially perpendicular to a sagittal plane of the spine.

59. The disk of claim 1 wherein said upper and lower housings with no force on the disk are spaced apart a maximum amount and force on any portion of the disk does not space the housings apart beyond said maximum amount.

60. The disk of claim 1 wherein with the disk implanted in a spine the shaft is adapted to be oriented along a lateral line with respect to the spine.

61. The disk of claim 1 wherein with the disk implanted in a spine the shaft is adapted to be oriented along an anterior/posterior line.

62. The disk of claim 16 including at least one of said first and second housings including a keel that is adapted to be positioned in a vertebral body of the spine.

63. The disk of claim 16 wherein at least one of the housings includes a keel that is positioned on said at least one housing so that with the disk implanted in a spine the keel is oriented laterally with respect to the spine.

64. The disk of claim 16 wherein at least one of the housings includes a keel that is positioned on said at least one housing so that with the disk implanted in a spine the keel is substantially perpendicular to a sagittal plane of the spine.

65. The disk of claim 16 wherein said first and second housings with no force on the disk are spaced apart a maximum amount and force on any portion of the disk does not space the housings apart beyond said maximum amount.

66. The disk of claim 16 wherein with the disk implanted in a spine the shaft is adapted to be oriented along a lateral line with respect to the spine.

67. The disk of claim 16 wherein with the disk implanted in a spine the shaft is adapted to be oriented along an anterior/posterior line.

68. The disk of claim 1 including BMP provided thereon.

69. The disk of claim 16 including BMP provided thereon

70. An artificial replacement disk that is positionable between vertebrae comprising:

a first housing including a first cavity and a second cavity;

a second housing including a third cavity and a fourth cavity;

wherein the first cavity and the third cavities are aligned with each other and are provide along an anterior/posterior line relative to a spine when the disk is implanted in a spine;

wherein the second cavity and the fourth cavities are aligned with each other and are provide along an anterior/posterior line relative to a spine when the disk is implanted in a spine;

a first spacer and a second spacer, said first and second spacers mounted on a first shaft with a first resisting member located between the first and the second spacers, which first resisting member can urge said first and second spacers apart; and

said first and second spacers partially located in said first cavity and partially located in said second cavity;

a third spacer and a fourth spacer, said third and fourth spacers mounted on a second shaft with a second resisting member located between the first and the second spacers, which second resisting member can urge said third and fourth spacers apart; and

said third and fourth spacers partially located in said third cavity and partially located in said fourth cavity; and

when the first housing is urged toward the second housing at least one of the first and the second spacers move relative to each other and against the first resisting member and the third and fourth spaces move relative to each other and against the second resisting member.

71. The disk of claim 70 including at least one of the first and second housings includes a keel extending therefrom, which keel is laterally oriented with the disk implanted in a spine.

72. The disk of claim 70 including at least one of the first and second housings including a keel extending therefrom, which keel is oriented about perpendicular to a sagittal plane of a spine with the disk implanted in a spine.

73. The disk of claim 1 wherein the first and second spacers are oval in cross-section.

74. The disk of claim1 wherein the first and second spacers are elliptical in cross-section.